CE

EM 8040

Versione 2.0 del 09/99

Italiano   Manuale di assistenza tecnica

English   Technical service manual

Français   Manuel d'assistance technique

Deutsch   Kundendienst-Handbuch

Español   Manual de asistencia técnica

ELECTRICAL HOOK-UP

All EM 8040 wheel balancers are supplied with single-phase mains electricity and are delivered pre-set for the power supply voltage required (100 V, 110 V or 220 V ac).
To modify this setting, the connection of the power supply transformer primary must be adapted to the mains voltage available.

SERVICE PROGRAMS

The purpose of these programs is to make available a number of data which allow a simple, rapid check on the efficiency of the various parts of the machine.
The selection procedure is as follows:
The selection procedure is as follows:

- <u>press either of the two</u> ⬆ and ⬇ <u>keys, and then, within two seconds, the</u>

⬛ key. This <u>presets</u> the first service program (87);

- press the ⬆ and ⬇ keys to select preceding (or following) programs from those available, until the desired program is obtained. Each selection provides display of the code 8X...9X (where X varies depending on the program) on the left-hand display, and of the message "Ent" flashing on the right-hand display, indicating

that the setting must be confirmed by pressing ⬛ Enter ;

- press ⬛ Enter the key to confirm.

If the setting is not confirmed within about three seconds, the system automatically exits from the Service environment.
The service programs which can be selected as "X" varies are described below.

87
Working environments:
- allows three different operators to work at the same time:
Selection of this program obtains display:
- of message 1, 2 or 3 on the right-hand display;
- of the OP (operator) message on the left-hand display.
This service program allows the operator (1, 2 or 3) to be selected by pressing the

⬛ Enter key.

To confirm selection of a different operator, press the ⬛ F key.

For each working environment, the following remain memorised:
- balancing procedure;
- wheel dimensions;
- latest passage of the optimisation (OPT) procedure.

To exit from the program (and from the Service environment), press the | **F** | key.

88
Sensitivity calibration (3 wheel spins):
- **allows calibration of the sensitivity with the maximum precision.**
This program must be carried out when the user considers that the calibration has shifted outside the tolerance limits or when the machine prompts the procedure by displaying the "ERR 1" message.
To calibrate:
- fit a wheel of average size (normally 5" x 14"), preferably already balanced, on the balancing machine;
- set the wheel dimensions correctly;
- select the service program.
When the selection has been made, the machine will display the message:
- CAL on the left-hand display
- GO on the right-hand display.
Perform an initial wheel spin.
On completion of the spin, turn the wheel to the position shown by the position indicator and by appearance of the message "100" (3.5 oz if display in ounces has been selected).
Apply a sample weight of 100 g. (3.5 oz) to the **inside edge** of the rim, at exactly 12 o'clock.

Perform a second wheel spin.

On completion of the spin, remove the sample weight from the inside edge and turn the wheel to the position shown by the position indicator and by appearance of the message "100".
Apply a sample weight of 100 g. (3.5 oz) to the **outside edge** of the rim, at exactly 12 o'clock.

GB

Perform a third wheel spin.

On completion of the spin, if the calibration procedure has been successful a consent message will appear temporarily. Otherwise, "Er3 CAL" will appear.

To exit from the program (and from the Service environment), press the | **F** | key.

90

RPA (Automatic Position Search)

When the selection has been made, the machine will display the message:
- RPA on the left-hand display
- 1, 2 or OFF on the right-hand display.

Once this program has selected, the [Enter] key can be pressed to set the maximum

number of attempts for automatic search for the position in which the weight is to be applied.
With selection of:
- OFF, automatic position search is disabled;
- 1, one attempt is made;
- 2, one or two attempts are made.
Selection of 2 allows the machine to carry out self-calibration, thus compensating for wear of the brake.

To exit from the program (and from the Service environment), press the [F] key.

91

Delete/restore

- **Display of the first gram of imbalance;**
- **rounding to the nearest inch of the diameter and width measured using the automatic sensors.**

Selecting this program obtains display:
- of the message "1 oF" on the right-hand display;
- of the message "on .5" on the left-hand display.
During normal operation, even when selection of imbalances in "gr x 1" is selected, the first gram of imbalance is not displayed. In this condition, when program "91" is

selected, the message "1 oF" appears on the right-hand display. Pressing the [Enter]

key allows the first gram also to be displayed from then on, with amplification of the sensitivity of the machine (the message "1 on" appears on the right-hand display). The

[Enter] key can be pressed after this to select the two modes in alternation.

At switch-on the machine presets to display the diameter and width measured with the automatic sensors with rounding to the nearest inch. In this condition, when program "91" is selected the message "on .5" appears on the left-hand display.

Pressing the [Enter] key allows the diameter and width measured with the automatic

sensors to be displayed from then on with precision of <u>one tenth of an inch</u> (the

message "oF 5" appears on the left-hand display). The [Enter] key can be pressed after

this to select the two modes in alternation.

 Important

Pressing the ![Enter] key modifies the setting shown on the display against which <u>the central circular element of the position indicator is illuminated</u>. To transfer the control from one display to the other, <u>press either of the two arrow keys</u> .

To exit from the program (and from the Service environment), press the ![F] key.

This program is used to:
- display the imbalance values with the maximum precision, so that a wheel can be balanced perfectly and further checks can then be performed on it;
- display, with the maximum precision (tenths of an inch), the correspondence between the diameter and width values measured with the automatic sensors and the nominal values of the wheel.

93
Display of software version installed

Selecting this program obtains display:
- of the message "rEL" (release) on the left-hand display;
- of the numerical message "XX.Y" on the right-hand display, corresponding to the version of the program installed (also shown on the EPROM label).

Pressing the ![Enter] key allows display of the date of the version in the format: day, month, year.

To exit from the program (and from the Service environment), press the ![F] key.

This program is used to:
check the version of the program installed on a machine, to allow updates to be made if necessary with no need to remove the circuit board from the machine in order to read the EPROM label.

GB

94

Display of standard imbalance values

Selecting this program obtains display of the imbalance values relating to the last wheel spin performed, calculated with reference to the standard calibration coefficients (the values used by the machine when the circuit board has never been calibrated, or if the calibration coefficients calculated previously have been deleted accidentally).

To exit from the program (and from the Service environment), press the **F** key.

This program is used to:
optimise clamping of the pick ups on the basis of the mechanical characteristics of the central unit or the specific electronic circuit board.

95

Display of first gain synchronisation coefficient

Selecting this program obtains display:
   • of the string "F" on the left-hand display
   • of the synchronization coefficient on the right-hand display.
The value is expressed in encoder notches (whole part) and eighths of an encoder notch (decimal part); one notch corresponds to about 1.4 degrees).

To exit from the program (and from the Service environment), press the **F** key.

This program is used to
check that the displayed values of the synchronisation coefficient are within the range envisaged, from -**2.0 to +2.0**.

96

Display of pick up signals and relative synchronisation.

Selecting this program obtains display:
- of the message "96" on the left-hand display;
- of the message "GO" which flashes on the right-hand display.

Before selecting the program:
- place a wheel of average size (typically 5" x 14") on the wheel balancer;
- balance it carefully after setting mode "1 on" using the service program 91;
- apply a weight of 100 gr (3.5 oz) to the outside of the rim;
- perform a wheel spin.
The machine acquires the imbalance signals and then displays, in sequence:
- the difference in angle F between the pick up signals and the ideal value of 180° (on the right-hand display). The value is expressed in encoder notches (whole part) and eighths of an encoder notch (decimal part); one notch corresponds to about 1.4 degrees).
- values proportional to the level of the signals received from the internal and external pick ups.

EM 8040 Technical service manual

Notes
- The values displayed do not depend on the dimensions set.
- When the wheel is at a standstill, the data measured can be displayed in alternation by pressing the $$$ key.
- A sequence of wheel spins can be performed without exiting from the program.

To exit from the program (and from the Service environment), press the | **F** | key.

This program is used to
check that the values displayed are within the ranges envisaged, which are:

- angle difference   **F**   **from -2.0 to +2.0**
- internal pick-up signal   **I**   **from 200 to 280**
- external pick-up signal   **E**   **from 110 to 170**

97 F

Display of operation of search (encoder) circuit board

Selecting this program obtains display:
- of the message "Pos" on the left-hand display;
- of a numerical value between 0 and 255, as the angular position of the shaft varies, on the right-hand display.

If the program is recalled immediately after the machine is switched on, the message "Pos rot" appears to indicate that the shaft has to be turned until the encoder zero mark has passed in front of the search board; at this point, the message disappears. It is also possible to perform a wheel spin (the message "97 GO" appears on the display) during which the pulses detected by the search board are counted. On completion of the spin, the left-hand display shows the expected count value (192), while the right-hand display shows the value actually counted, which flashes. The values remain on the displays for about five seconds, after which the current angular position of the shaft reappears.

To exit from the program (and from the Service environment), press the | **F** | key.

This program is used to
check that the search board is working properly. When the shaft is turned in both directions, the count must be updated continuously from 0 to 255 and on completion of a spin the two values displayed must be the same.

GB

98
Display of operation of sensor potentiometers

Selecting this program obtains display:
- of the message "di" on the left-hand display;
- of the (converted) voltage value received from the diameter potentiometer on the right-hand display.

When the sensor is turned, the value is updated continuously.

When the key is pressed, the system displays:

- the message "d" on the left-hand display;
- the (converted) voltage value received from the distance potentiometer.

This value is updated when the sensor is moved "in and out".

When the key is pressed, the system displays:

- the message "Lr" on the left-hand display;
- the (converted) voltage value received from the width potentiometer.

This value is also updated when the sensor is moved "in and out".

To exit from the program (and from the Service environment), press the key.

This program is used to
check operation of the potentiometers used for automatic data input; when the sensors are moved, the values displayed must vary continuously inside the following ranges:

diameter potentiometer	from 5 to 235;
distance potentiometer	from 5 to 240;
width potentiometer	from 5 to 255.

99
Setting wheel spin at pre-set speed

When this program is selected, the machine displays the default speed value (rpm)

set. The and keys can be pressed to modify the speed at which

acquisition will be carried out in subsequent wheel spins within this program.

To exit from the program (and from the Service environment), press the .key.

This program is used to:
check that the imbalance values are calculated with a good level of accuracy at all permitted wheel spin speeds.

SWITCH CONFIGURATION OF MBE MOTHER BOARD AND PEAL POWER SUPPLY AND CONTROLS BOARD

The boards used in the wheel balancer feature a number of hardware and software presettings which allow them to be used on other models. They are supplied in the configuration which allows them to operate correctly on the EM 8040 and so no intervention is necessary. The complete table is given to allow any checks.

BOARD	SETTING	FUNCTION	EM 8040
PEAL **73-6**	S 1	RL2 control from brake button	CLOSED
	S 2	Motor feedback interruption	OPEN
	S 3	RL2 control from motor control	2 - 1
	S 4	RL2-RL3 control from brake button	2 - 3
MBE - 166	J2 and J3	Analog setting of Low Speed	1 - 4
	J6 and J12	Selection of U111 RAM 62256	CLOSED
	J13	Selection of EPR1 27C010 and 27C020	2 - 3
	JP 15	Selection of CLKP fork	2 - 3
	SW1-1 SW1-2 SW2-1	Not used	not controlled
	SW2-2	Test/work	OFF
	SW3	START/STOP reversal	I
	JP9 (bridges)	Motor piloting	OPEN
	JP10 (bridges)	Motor piloting	2 - 3

GB

⚠️ **WARNING**

In case of replacement, do not use a Peal board of a version earlier to 73/6.

DIAGNOSTICS PROGRAMS

These programs are mainly used for repairing the circuit boards and must be used together with the electronic system diagrams of the boards themselves. They should therefore be used for this function alone; normally, knowledge of the service programs described previously is sufficient for identification of any defects by technical service personnel.

The purpose of these programs, resident in the program EPROM, is to test operation of the wheel balancer's mother board and its most important devices.
Specifically, the test is performed on:
- keyboard I/O lines (program t1);
- RAM (t 2);
- CTC and corresponding interrupt lines (t 3);
- non volatile memory (t 4);
- A/D converter, multiplexer, analog input lines (t 5);
- circuit for processing signals F0, F1 and F2 received from the encoder (t 6);
- stop line (t 7);
- "chip enable" signals generated by PAL / GAL (t 9);
- display (t 10).

To recall the programs, proceed as follows:
- switch off the machine;
- set microswitch 2 of the pair "SW 2" next to the top edge of the mother board, between the left-hand display and the corresponding position indicator, on "test" mode. This microswitch can be accessed without having to remove the board from the supporting panel;
- switch on the machine

Once the machine has switched on, the message "ttt" appears on both displays to indicate entry to the test environment.

The programs can be selected either in automatic sequence (except for "t 9") or individually.

* Automatic sequence

Pressing the key starts the automatic test sequence, with selection of program t1.

Program "t 1"
Selecting this program causes display of the message "t 1" on the right-hand display and subsequent testing of the PIO lines involved in control of the keyboard, to check that they are not interrupted or short-circuited with each other.
The six keys on the keypad have to be pressed in the following order:

, **START**. If there are no anomalies, when each key is pressed an "8" is displayed, starting from the first figure of the left-hand display and working through to the last figure on the right-hand display.

Pressing the **START** key also triggers temporary operation of the wheel spin motor to test the relative control and check that the motor relay is activated.

When the keys on the intersections of interrupted lines (outgoing columns or incoming lines) are pressed, no corresponding echo appears on the display.

If a short-circuit occurs between the tested line (line or column) and one of the lines not tested directly when the key is pressed, the message "Err 1" is displayed.

If the system has passed the test described above, the next test is automatically selected. Otherwise, it is possible to overrule the error condition and move on to the

next test by pressing the **F** key.

Program t 2

Selecting this program obtains display of the message "t 2" on the right-hand display and automatic execution of the test on the RAM, in which known bytes are written in the memory cells and the data written are then checked.

If the system has passed the test described above, the next test is automatically selected. Otherwise, one the following messages is displayed:

- "Err 2" in case of errors when the data written are checked, due to a short circuit between the lines of the data bus or between the data bus lines and the power supply lines.
- "Err 3" in case of errors when the RAM addresses are checked, due to a short circuit between the lines of the address bus or between the address bus lines and the power supply lines.

In case of an error, it is possible to overrule the error condition and move on to the

next test by pressing the **F** key.

Program t 3

Selecting this program obtains display of the message "t 3" on the right-hand display and automatic execution of the test on correct operation of the CTC and the corresponding interrupt lines.

If the system has passed the test described above, the next test is automatically selected. Otherwise, the message "Err 4" appears on the displays; it is possible to

overrule the error condition and move on to the next test by pressing the **F** key.

Program t 4

Selecting this program obtains display of the message "t 4" on the right-hand display and automatic execution of the test on the E^{2}PROM in the same way as for program t 2

If the system has passed the test described above, the next test is automatically selected. Otherwise, the message "Err 5" appears on the displays; it is possible to

overrule the error condition and move on to the next test by pressing the **F** key.

GB

Warning: the test causes deletion of the non volatile memory!

This means that on exit from the test environment, it will be necessary to carry out all the calibration and setting procedures which involve the saving of data on E^{2}PROM.

Program t 5
Selecting this program obtains temporary display of the message "t 5" on the right-hand display, followed by activation of the test. More specifically:
- selecting the program activates the test on channel 0 of the multiplexer and display of the relative converted value;

- pressing the [↓] key activates the test on the channels which follow;

- pressing the [↑] key activates the test on earlier channels.

The following is a table containing the expected values for each individual channel.

Channel	Signal	Expected value
0	Internal pick up 1st gain	From 120 to 140 (typ. 127)
1	Internal pick up 2nd gain	Idem
2	External pick up 1st gain	Idem
3	External pick up 2nd gain	Idem
4	Diameter potentiometer	From 5 to 235
5	Width potentiometer	From 5 to 255
6	Distance potentiometer	From 5 to 240
7	Input not controlled	

The value displayed can be updated by pressing the [Enter] key. There is also a check on the line signalling that conversion has taken place, to check for any short circuits or interruptions. If no signal is detected after a preset delay, the displays show the message "Err 6".
To exit from this program (and select the next program), or to overrule an error

condition, press the [F] key.

Program t 6
Selecting this program obtains temporary display of the message "t 6" on the right-hand display, after which the test which displays the angular position of the machine shaft in relation to the encoder zero notch (in the mode: Pos nnn) is activated.
The program is identical to program 97 selected in the service environment. To exit

and select the next program, press the [F] key.

Program t 7
Selecting this program, with the safety guard lowered, obtains temporary display of the message "t 7" on the right-hand display.
The user must press the STOP key or raise the safety guard, after which the message "Stp" appears on the left-hand display if the stop line is found to be operational. If the line does not work or if the user does not wish to perform the test, it is possible to exit

from the program (selecting the next one) by pressing the [F] key.

Program t 9

Selecting this program obtains display of the message "t 9" on the right-hand display, followed by execution of the test on the PAL. However, in order to check that the various chip selects are being generated correctly an oscilloscope should be used as described below:
- connect the ground probe to test point TP 17 of the CPU board;
- connect the other probe to tab 12 of the PAL (U 5);
- check that, during execution of the test, the measure of the signal detected passes periodically from the high to the low level (in correspondence with generation of the relative Chip Enable);
- repeat the check, moving the second probe onto all the other PAL output tabs (from 13 to 19 except number 17).

⚠️ **WARNING:**

this program can only be selected individually, i.e. outside the automatic sequence.

To exit, and thus select the next test, press the 〔 **F** 〕 key.

Program t10

Selecting this program obtains display of the message "t10" on the right-hand display, followed by testing of the individual illuminating dots on the circuit board. Since this test lasts some considerable time and is not always necessary, it is not activated until

the selection is confirmed using the 〔Enter〕 key (in the automatic sequence only).

Otherwise, the 〔 **F** 〕 key can be pressed to exit from the program and return to the

initial condition, with the message "ttt" shown on both displays.

* Direct selection of a program

Once the text environment has been accessed (with "ttt" shown on both displays) the programs can be selected one by one using the arrow keys, in the same way as for the service programs.

Specifically: pressing the 〔⬆〕 and 〔⬇〕 keys gives <u>presetting</u> of the programs in

GB

accordance with the sequence described previously, and display of the message "t X" which flashes on the right-hand display. The fact that the message <u>flashes</u> indicates

that the presetting of program X must be confirmed by pressing the 〔Enter〕 key.

Once the selection is confirmed, the message stops flashing and becomes constant, and each individual program can be used exactly as described for the automatic sequence. Exiting from a program recalls the initial status of the test environment ("ttt" on both displays).

Programs t 2, t 3, t 4 and t 5 can be **executed in a loop**. To select this mode, confirm

the program presetting by pressing the **START** key instead of Enter . To exit, press

F . This option is useful to perform tests in cyclic mode, in order to identify any

malfunctions using an oscilloscope.

To return the machine to normal operating conditions, proceed as follows:
- switch off the wheel balancer;
- turn microswitch 2 of the "SW 2" pair on the mother board to the "work" position;
- switch the machine back on.

REMOVING THE WEIGHT-HOLDER LID

- Unscrew the four self-tapping screws which fix the guard of the head support, two at
  the back and two at the front (concealed by the black caps).
- Unscrew the four screws on the weight-holder lid and remove the anvil;
- Remove the internal sensor arm by unscrewing the M6 screw and slackening the M5
  stud bolt;
- Remove the weight-holder lid.

REPLACING AND ADJUSTING THE INTERNAL SENSOR POTENTIOMETERS (DISTANCE AND DIAMETER)

- Select service program "98" to display data relating to the sensor potentiometers. The first value displayed refers to the diameter potentiometer (the corresponding LED illuminates on the display panel).
- Remove the complete sensor, unscrewing the two M6 screws which fix it to the supporting columns.
- Disconnect the potentiometer wires.

Diameter potentiometer
- Remove the diameter potentiometer complete with its gear wheel.
- Remove the gear wheel and fit it on the new potentiometer, tightening the screw so that it turns with friction on the shaft and allows the next adjustment.
- Fit the new potentiometer with the relative gear wheel in the support on the sensor so that the backlash between the gear wheels is minimal in all positions.
- Re-connect the wire to the diameter potentiometer (RP2).
- Turn the lever completely clockwise (position for the minimum diameter which can be measured) and then, keeping the gear wheel still, use a screwdriver to turn the potentiometer shaft until a value of 5 +/-1 appears on the right-hand display.
- Tighten the screw in this position to fix the gear wheel to the sensor shaft.
- Turn the lever completely anti-clockwise (position for the maximum diameter which can be measured) and check that there is no break in the electrical signal provided by the potentiometer, and that the gear wheels are correctly matched throughout the travel stroke

Since the potentiometer stroke corresponds to about 230 numbers, if the trimmer has been set on 5 in the position for the minimum measurable diameter, the limit stop value will correspond to about 235.

Distance potentiometer
- Press the   key for setting the wheel data with the keyboard to display the value relating to this potentiometer on the right-hand display (the distance LED illuminates on the display panel).
- Remove the drive wire from the pulley seats.
- Remove the large pulley, undoing the screw which fixes it to the potentiometer.
- Remove the distance potentiometer.
- Fit the new potentiometer.
- Replace the pulley on the potentiometer, tightening the screw so that it turns with friction (it is not completely locked in place), allowing the shaft to be turned in relation to the gear wheel during the adjustment phase described below.
- Replace the drive wire, positioning it correctly on the seats of the two pulleys.
- Re-connect the cable to the distance potentiometer (RP1).
- Bring the sensor to the rest (fully retracted) position, and keeping the pulley still, use a screwdriver to turn the potentiometer shaft until the right-hand display shows a value of 5 /-1.

GB

- Tighten the screw in this position to fix the gear on the potentiometer shaft.
- Bring the sensor to the stroke end position to check the electrical continuity of the potentiometer.

Since the potentiometer stroke corresponds to about 235 numbers, if the trimmer has been set on 5 in the position for the maximum measurable diameter, the limit stop value will correspond to about 240.

- Replace the complete sensor using the two M6 screws which fix it to the supporting columns.
- Check that the diameters obtained are correct using wheels of known dimensions (or a special instrument). To obtain these data accurate to a tenth of an inch, first select the function "oF.5" inside service program "91". The maximum error permitted on the wheel used for calibration is +/- 0.1 inches.

Notes

Bear in mind that the nominal width and diameter of the wheel (e.g. 6", 14") refer to the surfaces which support the tyre beads, which are obviously the insides of the rim. On the other hand, the data measured refer to outside surfaces and are therefore lower than the nominal values because of the thickness of the rim. The differences are compensated by the sensor calibration procedure, so that the values obtained are the same as the nominal values, which provide the user with a consolidated reference. Obviously, the compensation is made with reference to the thickness of the rim used in the calibration procedure, so the data measured after this on wheels of different thickness may show slight variations (maximum 2 - 3 tenths of an inch) from the nominal values. This is not an error in the accuracy of the devices, but reflects the real situation.

In order to let the real geometrical values and those obtained coincide fairly well throughout the range of variation of the parameters, the reciprocal positions of the wheel support shaft and the sliding shaft of the sensor must be correct. The axes of the two shafts must be parallel in space (and thus on the horizontal and vertical planes) and must be pre-set distances apart.
This condition is met during testing in the factory, and so if a potentiometer is replaced no further intervention is required.

REPLACING AND ADJUSTING THE EXTERNAL SENSOR POTENTIOMETER (WIDTH POTENTIOMETER)

- Select service program "98" to display data relating to the sensor potentiometers. The first value displayed refers to the diameter potentiometer (the corresponding LED illuminates on the display panel).
- Press the key for setting the wheel data with the keyboard twice to display the value relating to this potentiometer on the right-hand display (the width LED illuminates on the display panel).
- Unscrew the screws of the external sensor cover and remove it;
- Disconnect the potentiometer wire;
- Release the spring from the eye in the potentiometer support plate;
- Unscrew the screw fixing the potentiometer support plate;
- Remove the gear wheel and fit it on the new potentiometer, tightening the screw so that it turns with friction on the shaft and allows the next adjustment.
- Fit the new potentiometer with the relative gear wheel on the plate so that the gear wheel teeth mesh correctly.
- Re-engage the spring in the hole provided;
- Re-connect the potentiometer wire.
- To adjust the potentiometer, remove the cap on the sensor support box and use a screwdriver to turn the potentiometer shaft until the right-hand display shows a value of 5 +/-1.
- Tighten the screw in this position to fix the gear wheel to the sensor shaft.
- Turn the sensor completely towards the machine's wheel rest flange, checking the electrical continuity of the potentiometer and the correct meshing of the gears through the entire stroke.

Since the potentiometer stroke corresponds to about 250 numbers, if the potentiometer has been adjusted at rest at the value 5, the value at the end of the stroke will be about 255.

- calibrate the sensor, using the procedure described in the operator's manual.
- Check that the widths measured are correct, using wheels of known dimensions or a suitable instrument. To obtain these data with accuracy to a tenth of an inch, select the function "oF.5" inside service program "91". The maximum error permitted on the wheel used for calibration is +/- 0.1 inches.

GB

Notes

Bear in mind that the nominal width and diameter of the wheel (e.g. 6", 14") refer to the surfaces which support the tyre beads, which are obviously the insides of the rim. On the other hand, the data measured refer to outside surfaces and <u>are therefore lower than the nominal values because of the thickness of the rim</u>. The differences are compensated by the sensor calibration procedure, so that the values obtained are the same as the nominal values, which provide the user with a consolidated reference. Obviously, the compensation is made with reference to the thickness of the rim used in the calibration procedure, so the data measured after this on wheels of different thickness may show slight variations (maximum 2 - 3 tenths of an inch) from the nominal values. This is not an error in the accuracy of the devices, but reflects the real situation.

EM 8040 Technical service manual

REPLACING AND ADJUSTING THE PICK-UPS

- Remove the weight-holder lid and the side guard in order to have access to the internal devices of the machine.
- Disconnect the connection to the pair of pick-ups.
- Remove the pick-ups, unscrewing the two M8 stud bolts (to have easier access to the internal pick-up unscrew the M8 self-locking nut to remove the automatic brake lever).
- Fit the new pair of pick-ups taking care that the balls are correctly positioned inside the recesses provided and tighten the stud bolts so that the pick-ups are not completely locked in place.
- The pick-up marked **I** (internal) must be fitted on the right and the one marked **E** (external) on the left (when working standing in front of the machine).
- Re-connect the pick-up connector.
- Set mode "1 On" selecting the service program "91" to display the imbalance values with the maximum precision.
- Fit a wheel of average dimensions (e.g.: 5" x 14") on the wheel balancer shaft and balance it with the maximum precision.
- Imbalance the wheel by placing 100 grams (3.5 oz) on its outside wall.
- Select service program "96" and perform a wheel spin to check the signal and pick up synchronisation values.

The correct values are the following:
- angle difference   **F**   **from -2.0 to +2.0**
- internal pick-up signal   **I**   **from 200 to 280**
- external pick-up signal   **E**   **from 110 to 170**

If the values displayed at the end of the spin are not within the specified ranges, use the stud bolts to adjust the tightness of the pick-ups until the required conditions are met.

These values are normally obtained with a tightening torque of 1.7Nm.
- Tighten the lock-nuts into a pack and then unscrew them slightly (by about one side of the hexagon) so that the Belleville washers fitted can operate.

During these operations, keep the respective stud bolts still so that the pick-up preloading conditions are not altered.
- Fit the side guard and re-close the weight-holder lid.
- Carry out the sensitivity calibration procedure.

REPLACING THE COMPLETE CENTRAL UNIT

After verifying that the unit is the real cause of the anomalies detected on the machine, replace it as described below.
- Remove the weight-holder lid.
- Remove the encoder circuit board complete with support, unscrewing the two M8 fixing screws.
- Disconnect the ground and power supply wires of the motor and of the disengaging electromagnet.
- Remove the central unit, complete with wheel spin device, after unscrewing the two M12 fastening screws with a 19- spanner.
- Remove the wheel spin device unscrewing the three M8 screws and fit it onto the new central unit, checking that the pinion teeth are centred in relation to the ring gear teeth. Otherwise adjust the motor position on its support.
- Fix the search board with the two M8 screws, taking care that the encoder disc teeth slide inside the fork without damaging it.
- Fit the new assembly with the two M12 screws.
- Reconnect the ground and power supply wires of the motor , the electromagnet, the pick-up and the search board.
- Re-close the weight-holder lid.
- Carry out the sensitivity calibration procedure.

REPLACING THE WHEEL SPIN MOTOR

- Remove the wheel-holder lid.
- Disconnect the block connectors (red and black) of the motor power supply wires from the RC filter.
- Unscrew the two screws which fix the metal clamps which secure the motor.
- Remove the motor from the support.
- Check the pinion wear and use it on the new motor only if it is in good conditions.
- Remove the pinion, undoing the M4 stud bolt which fixes it.
- Fit the pinion onto the new motor using the M4 stud bolt (precedentemente trattato con frenafiletto medio), taking care that its tip rests on the recess provided in the motor shaft.
- Place the new motor on the support, so that the pinion teeth are centred in relation to the ring gear teeth.
- Fix the motor to the support by screwing the screws on the fixing clamps.
- Re-connect the motor power supply wires to the filter by means of the two block connectors (the white mark on the filter sheath to the positive).
- Clean the brake shoe on the bell with alcohol.
- Perform a few wheel spins to check that the motor operates correctly. If necessary, adjust the wheel spin and braking device as described in the relative section of the manual.
- Re-close the weight-holder lid.

GB

REPLACING AND ADJUSTING THE MOTOR DISENGAGING ELECTROMAGNET (YA1)

- Remove the wheel-holder lid.
- Disconnect the power supply wires of the electromagnet.
- Unscrew the two M5 screws which fix the electromagnet.
- Fit the new electromagnet.
- Adjust the motor disengaging electromagnet so that during the disengaging phase, the distance between the pinion and ring gear teeth is at least 1 mm
- Check that the safety microswitch is correctly adjusted as described in "Replacing/ Adjusting the motor safety microswitch".
- Re-close the weight-holder lid.

REPLACING AND ADJUSTING THE BRAKING ELECTROMAGNET (YA2)

- Remove the weight-holder lid and the side guard.
- Disconnect the electromagnet power supply wires.
- Disconnect the M4 nut on the core guide rod.
- Unscrew the two M5 screws which fix the electromagnet.
- Fix the new electromagnet so that the screws turn with friction.
- Re-connect the electromagnet power supply wires.
- Modify the vertical position of the electromagnet as follows:
  • move the electromagnet downwards;
  • gradually move the electromagnet up until when the brake is operated using the STOP key, the core reaches the limit stop position.
- Tighten the fixing screws.
- Screw the M4 nut on the guide rod so that in rest position the minimum distance between the brake shoe and the bell is about 2 mm.
- Perform a few wheel spins to check that the device works properly during braking.
- Fit the side guard and re-close the weight-holder lid.

REPLACING THE BRAKE SHOE

- Remove the weight-holder lid and the side guard.
- Unscrew the self-locking M6 nut to replace the brake shoe (when replacing the brake shoe, take care to position the washers correctly).
- Tighten the self-locking nut on the pin so that there is no clearance between beake shoe and lever (the brake shoe must be free to move).
- Clean the brake shoe on the bell with alcohol.
- Check the correct adjustment of the electromagnet, as described in "Replacing and adjusting the braking electromagnet".
- Perform a few wheel spins to check that the braking device works correctly during braking.
- Fix the side guard and re-close the weight-holder lid.

REPLACING/ADJUSTING THE MOTOR SAFETY MICROSWITCH

- Remove the weight-holder lid.
- Disconnect the two faston connectors from the microswitch to be replaced.
- Unscrew the two fixing nuts and remove the microswitch.
- Fix the new microswitch and connect the two faston connectors to the "normally closed" contacts.
- Adjust the position of the microswitch using the fixing nuts, so that after adjustment, when the motor is moved towards the unit, the microswitch is tripped when the pinion teeth are engaged by about two thirds of their height.
- Move the motor to check manually that the microswitch is tripped in the above described position correctly.
- Perform a few wheel spins to check that it takes place correctly.
- Re-close the weight-holder lid.

GB

TROUBLESHOOTING

The EM 8040 is equipped with self-testing and self-diagnostics programs which provide information about most of the possible malfunctions and the relative reparations **(refer to the list of error messages and to the "troubleshooting" section of the operator's manual)**.
However, there are some malfunctions which the machine is not able to identify; a list of them follows.

⚠ **WARNING!**

For all anomalies of an electrical nature, always check, before replacing a circuit board:

- that the power supply cable on the transformer primary is connected correctly for the mains power available;
- that the transformer secondary voltages are the same as the rated values envisaged (use a tester pre-set as an AC voltmeter and refer to the annexed drawing of the transformer);
- the quality of the wiring between the components probably involved in the malfunction. In particular, check:
- that the connectors are connected correctly;
- that the contacts are correctly fixed to the ends of the individual wires of the cables;
- that stability of the mains power voltage in the zone where the machine is installed and the effectiveness of the workshop's earth system;
- that there is no damage to the protective fuses on the transformer and on the power supply board, as well as the illumination of the LEDs on the same board which signal that the various power supply voltages are available.

The following table summarises the information provided on the general electrical diagram.

Fuse	Type	Value	Position	Protected power supply	Indicator LEDs
FU1	T	T 5 A	Transformer	Monitor	
FU2	T	T 5 A	Transformer	All	All
FU3	T	T 5 A	Transformer	All	All
FU4	T	T 5 A	Transformer	All	All
FU5	T	3.15 A	Transformer	Monitor	
FU6	T	3.15 A	Transformer	All	All
FU1	F	3.15 A	PEAL Board	+ 5 V	L2, L5
FU2	F	0.5 A	PEAL Board	± 12 V	L1, L3
FU3	F	0.5 A	PEAL Board	± 12 V	L1, L3
FU4	T	20 A	PEAL Board	24 V (Motor)	
FU5	F	4 A	PEAL Board	24 V (Motor disengager coil)	
FU6	F	4 A	PEAL Board	24 V (Brake coil)	

The machine does not switch on

Use a voltmeter to check that the power supply voltage is present on the terminal board of the transformer <u>primaries</u>.

1) If there is no power on the primaries, check:
- the condition of the power supply socket and the relative protective fuses;
- that the plug is connected to the machine's power supply lead correctly;
- that the mains cable is undamaged;
- that the master switch is working correctly.

2) If there is power on the primaries, check:
- that the fuses of the transformer are undamaged;
- that the specified voltages are present on the transformer secondaries;
- that the PEAL "power supply and control circuit board" is working correctly, by checking;
  - for damage to the fuses on the board and that the relative indicator LEDs illuminate;
  - the values of the power supply voltages available by means of the Jalsk connector (refer to the annexed diagram of the circuit board);
- that the mother board power supply cable is wired correctly and that its connectors are correctly connected;
- for any short-circuits on the peripherals. To do this, disconnect all the cables from the mother board connectors, except for the power supply cable, and try switching on the machine.

If the previous checks have not identified faulty components, replace the mother board.

The machine does not perform the wheel spin when the START button is pressed and/or when the guard is lowered

In this case, the various causes can be identified using the information on the displays.

1) The displays continue to show the imbalance values calculated previously.
- The mother board is not receiving or does not "hear" the START signal from the keyboard or from the microswitch.

Check:
- that the automatic start microswitch associated to the wheel protection guard is operating correctly (when the guard is lowered the switch contact must be <u>closed</u>);
- that the cam which trips the automatic start device microswitch is adjusted correctly;
- that the automatic start microswitch is wired correctly;
- that the START key is operating correctly.

If the previous checks have not identified faulty components, replace the mother circuit board.

GB

2) **The displays show the geometrical data of the wheel.**
The mother board is receiving the signal from the START button or the microswitch, but the consequent command is not carried out.
Check:
- that the "Commands cable" connecting the mother board and the "controls and power supply board" is correctly connected and wired;
- that the "controls and power supply board" is operating correctly; in particular, check the fuse FU4 and the relay which supplies power to the wheel spin motor;
To do this, proceed as follows:
  • disconnect the motor power supply wires;
  • place the terminals of a tester, used as a DC voltmeter, in contact with the ends of the disconnected wires;
  • press the START button. If the piloting part upstream of the measuring point (relay included) is operating correctly, a voltage value of around 28 Volts must be read on the instrument.
- that the wheel spin motor is undamaged.

If the previous checks have not identified faulty components, replace the mother circuit board.

3) **The displays show the message "Cr Err".**
The contact of the microswitch associated to the safety guard is open.
Check:
- that the guard is lowered when a wheel spin is carried out (by pressing the START button).
- that the automatic start microswitch associated to the wheel safety guard is operating correctly (the switch contact must be closed when the guard is lowered).

If the previous checks have not identified faulty components, replace the mother circuit board.

4) **The displays show the message "Err 29"**
- Try performing another wheel spin;
- check that the connecting cable between the microswitches and the power supply board has been connected correctly.
- if the error recurs, check that the safety microswitch is correctly set and operating properly; see "Adjusting the wheel spin/braking device and safety microswitch".

5) **The displays show the message "Err 30"**
If abnormal noise is noticed, check the condition of the pinion.
If the wheel rotates, check operation of the encoder circuit board, see "Service programs".
If the motor does not start:
- check fuse FU4 on the Peal board;
- check that the motor power supply cable is connected correctly;
- check operation of the Peal board;
- check operation of the motor.

At switch-on, the displays show "ttt"

After switching the machine off, set microswitch 2 of the "SW 2" pair on Work as described in "mother board switch settings".

The diameter and/or distance values acquired automatically using the sensors are different from the real values

Check, in the service environment, that the potentiometers are working correctly (also see the points describing the procedures for replacing and adjusting the sensor potentiometers):
- • their continuity throughout the working range;
- • that the range is as envisaged.

If there are no problems on the potentiometers, it may be sufficient to calibrate the sensors correctly (see instructions in the operator's manual for removing the fault). For small differences (no more than one inch) encountered above all with alloy rims which are thicker than normal, the comment made in the section of the manual referred to above applies.

When switched on the machine is shut out (it does not accept any commands)

Check:
- that all the keys on the keyboard are undamaged, i.e. that no keys are sticking down because of a breakage. If this is the case, replace the faulty key or the entire mother board;
- that no key is remaining permanently pressed down because the mother board has not been correctly mounted on the supporting panel.
  Whenever a board is mounted on the panel, great care must be taken to ensure that the keys, welded directly onto the mother board, operate correctly. To ensure this, proceed as follows:
  - • tighten the four mother board fixing nuts located close to its corners;
  - • partially tighten the two nuts close to the keys;
  - • press all the keys on the panel to check that they are operating correctly;
  - • make fine adjustments to the tightness of the two nuts so that the keys are in contact with the polyester film but are not over-pressurised.

GB

EM 8040 Technical service manual

The balancer supplies imbalance values which are not repeated in successive wheel spins (differences of over 3 grams with imbalances of the order of 30 grams)

Check, in this order:
- that the machine is resting on the floor in a stable manner and that the rubber feet are not damaged;
- that the weight-holder lid is correctly positioned, i.e. that it does not rub against the bell of the central unit during the wheel spin;
- that the brake shoe or pinion of the wheel spin device does not touch the pulley during the signal acquisition phase. This might occur because the wheel spin and braking device is not correctly adjusted; modify the settings following the instructions given in the relative section of this manual;
- that the wheel is clamped to the shaft effectively, i.e. that there is no slipping between the wheel and the supporting flange during the wheel spin.
  To check this, use chalk to make two reference marks, one on the flange and one on the wheel, exactly in line with each other. Check after a few spins that the two marks have not shifted out of line with each other at all;
- that the two pick-ups are fixed with the correct torque, referring to the signal values displayed using the "96" service program;
- that the mother board is working correctly, by replacing it with a new one.

If the checks described above have not shown any faults, replace the central unit, checking for any noise on the bearings.

It is not possible to balance the wheel: when the weights indicated by the balancer are applied and then a wheel spin is performed, new imbalance values appear at random

Make the checks listed in the previous point.
Also check:
- that the geometrical dimensions set are correct;
- that the machine is correctly calibrated, by carrying out the calibration procedure;
- that the cable which connects the encoder circuit board to the mother board is correctly connected and wired;
- that the encoder circuit board is working correctly, using service program "97" (see "Service programs"). An operating defect of the encoder circuit board prevents the machine from calculating the position of the imbalances correctly. In this case, check:
  • that the photo-diodes of the encoder circuit board are clean;
  • that the fork is correctly mechanically adjusted in relation to the encoder.

If the malfunction persists, replace the encoder circuit board.
If the defect is still not removed, replace the mother board.

The motor remains on, continuing to drive the wheel, and the wheel spin does not end

Make all the checks on the search circuit board referred to above. Also check that the power supply and control circuit board is in good working order, with special reference to the motor power supply relay.

The braking procedure at the end of the cycle is too long or noisy

- Check that the braking device is set correctly (see specific point) and inspect the brake shoe for wear.
- Check that the brake lever moves freely and that there is no excessive backlash.
- Check that there is no backlash between the shoe and the lever; otherwise, tighten the lock-nut on the fulcrum pin (the shoe must always be free to move around).

If the braking noise persists, sand the rubber of the brake shoe with medium-grain sandpaper.

Always clean the brake shoe and the working surface on the bell.

The wheel spin device is noisy

Check, in this order:
- that the pinion of the wheel spin motor is engaging correctly (see "Adjusting the wheel spin and braking device");
- that the pinion is not excessively worn;
- that the ring gear is not excessively worn;
- that the motor is not mechanically damaged.

During a wheel spin:

* the machine shuts out with the beeper activated;

* unknown characters appear on the monitor;

* the machine performs a lamp test and resets.

The defect, normally sporadic, may occur because of a momentary failure of the power supply to the mother board, or because of a disturbance or a malfunction of the mother board.

Check:
- that the mother board power supply cable is correctly wired and that its connectors are connected correctly;
- that the "power supply and controls circuit board" is operating correctly, particularly checking:
  • the values of the power supply voltages available by means of the Jalsk connector (refer to the annexed diagram of the circuit board);
- that the mother board power supply cable is correctly wired and that its connectors are connected correctly;
- that the motor power supply wires are separate from the signal wires;
- that the RC filter on the wheel spin motor is operating correctly (or present).

If the previous checks have not identified faulty components, replace the mother board.

GB

Touching the metal parts of the balancer gives an electric shock

Check that the power supply socket is earthed correctly (this is essential for correct operation of the machine as well as for safety reasons).

ANNEXED DRAWINGS AND DIAGRAMS

EM 8040 general electrical system diagram - **code 454241_5**

AP1	Power supply and controls circuit board
AP2	Mother board (CPU)
AP5	Search circuit board
BP1	Inside pick-up
BP2	Outside pick-up
M1	Motor
QS1	Master switch
RP1	Inside distance potentiometer
RP2	Diameter potentiometer
RP3	Outside distance potentiometer
SQ1	Safety guard microswitch
SQ4	Motor microswitch
TC1	Power supply transformer
XB1	Connector
XS1	Power supply socket
YA1	Motor coil
YA2	Motor disconnector/brake coil
Z1	Mains power filter
Z2	Filter for remote switch/motor

230/115/100 V autotransformer - **code 438727G**

01	PHOENIX 6 way terminal board, pitch 5.08 mm
02	Single-wire cable G.V. gauge 1.5
03	Transparent connection unit cover 6.3 mm
04	Female connection unit 6.3 mm
05	Shoe for wires gauge 2.5
06	Sheath dia. 10
07	Shoe for wires gauge 1
08	Shoe for wires gauge 1.5

Construction specifications
- Power supplied by the primary (0-230V) as autotransformer: 80VA
- Power supplied by secondaries: 290 VA
- Fuses FU1..F4 = T 5A/FU5..FU6 = T 3.15A
- Insulation voltage: 2000 V
- Voltages on the secondaries refer to full load, simultaneously.
- When the rated voltage on the primary is kept constant, the voltage measured on the secondary without load must have a tolerance of +5% MAX

- Secondary conductors 20V gauge 2.5 mm2 - L=200 mm
  Secondary conductors 9V, 12-0-12V: gauge 1 mm2 - L=200 mm

Power supply and controls circuit board (Peal) - **code 454218A**

EM8040 mother board - **code 452150**

GB

	TC1 (220V)	AP1
FU1	T 5A	3.15A
FU2	T 5A	500mA
FU3	T 5A	500mA
FU4	T 5A	T 20A
FU5	T 3.15A	4A
FU6	T 3.15A	4A

EM 8040

Cod. 454241_5

EM 8040

FU6
230V

FU5
230V

FU4
115V

FU3
100V

FU2
0V

FU1
0V

GND

Morsettiera lato primario

230V   FU6

FU5

115V   FU4

100V   FU3

FU2

0V   FU1

GND

12V

I – 300mA

0V

I – 300mA

12V

9V

I – 2.5A

0V

20V   20V

I – 13A

0V   20V

EM 8040
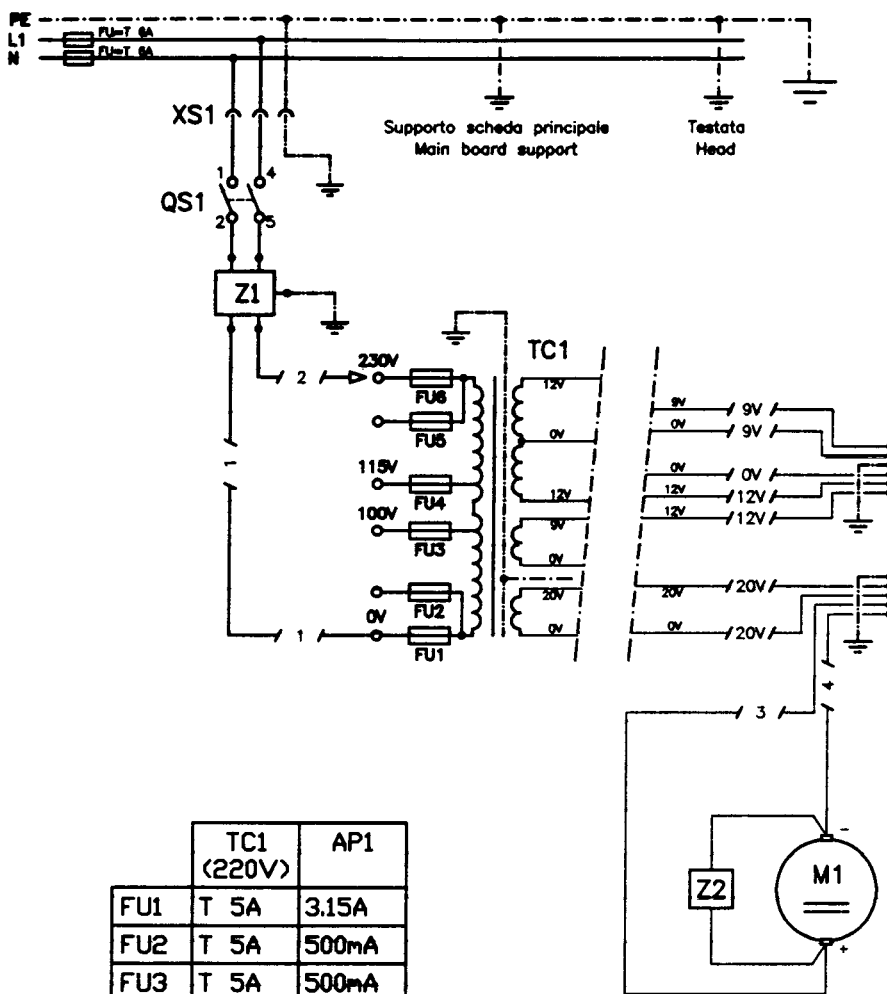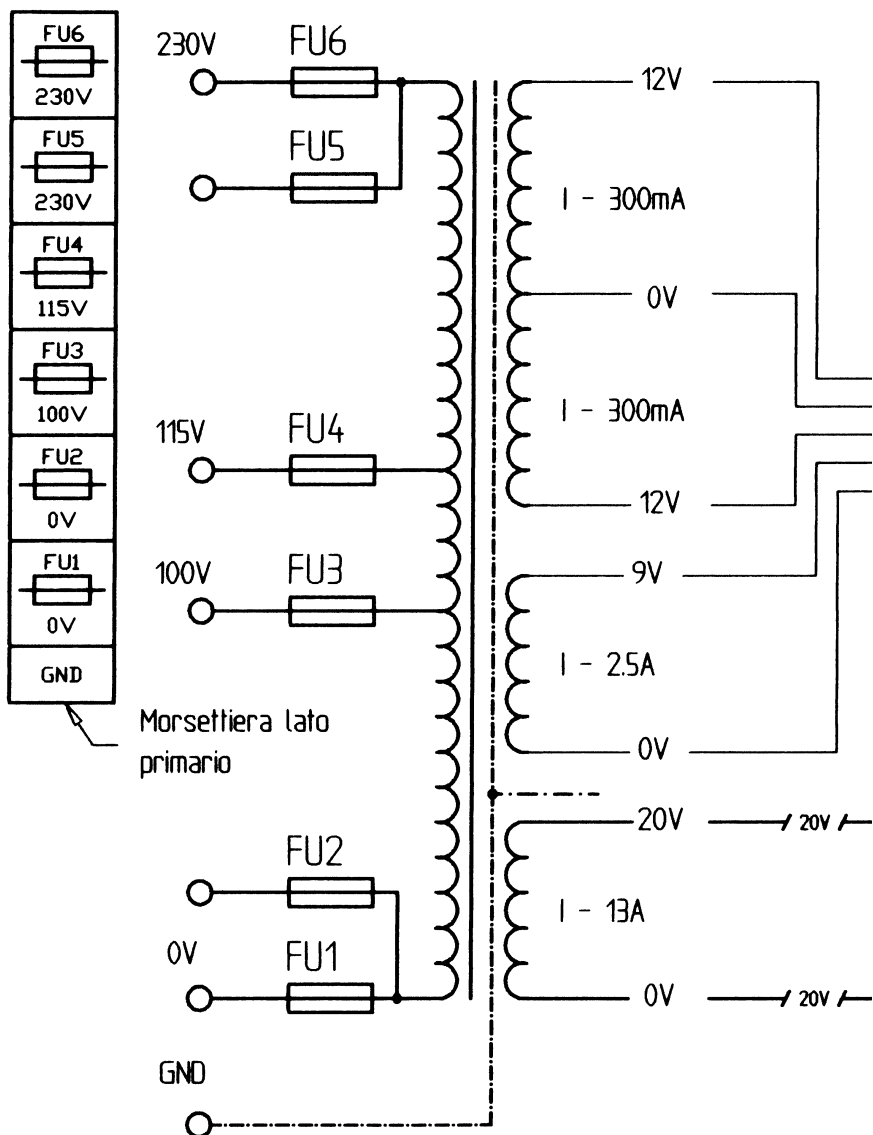
Morsettiera 6 poli

N	Segnale
1	12V
2	12V
3	0V
4	Terra (Giallo/Verde)
5	9V
6	0V

03 04

02

12V
12V
0V

9V
9V

1

6

06

01 07 08

05

90

70

100

Cod. 438727G

EM 8040

Dimensions: 200, 79, 14, 87, 131, 101, 20

JALF1 1—2
JALSK2 1—5
JI01 1—18
JD2 1—
JALSK1 1—8
JC1 1—8

L2 ⊛ +5Vcc Display
L5 ⊛ +5Vcc CPU
L3 ⊛ -12Vcc
L1 ⊛ +12Vcc
L4 ⊛ Feed back START (Autoritenuta JD1)

FU1-3.15A
FU2-500mA
FU3-500mA

JAL1 6—1
FU4-20A
MALM1 5—1

N. 6 f
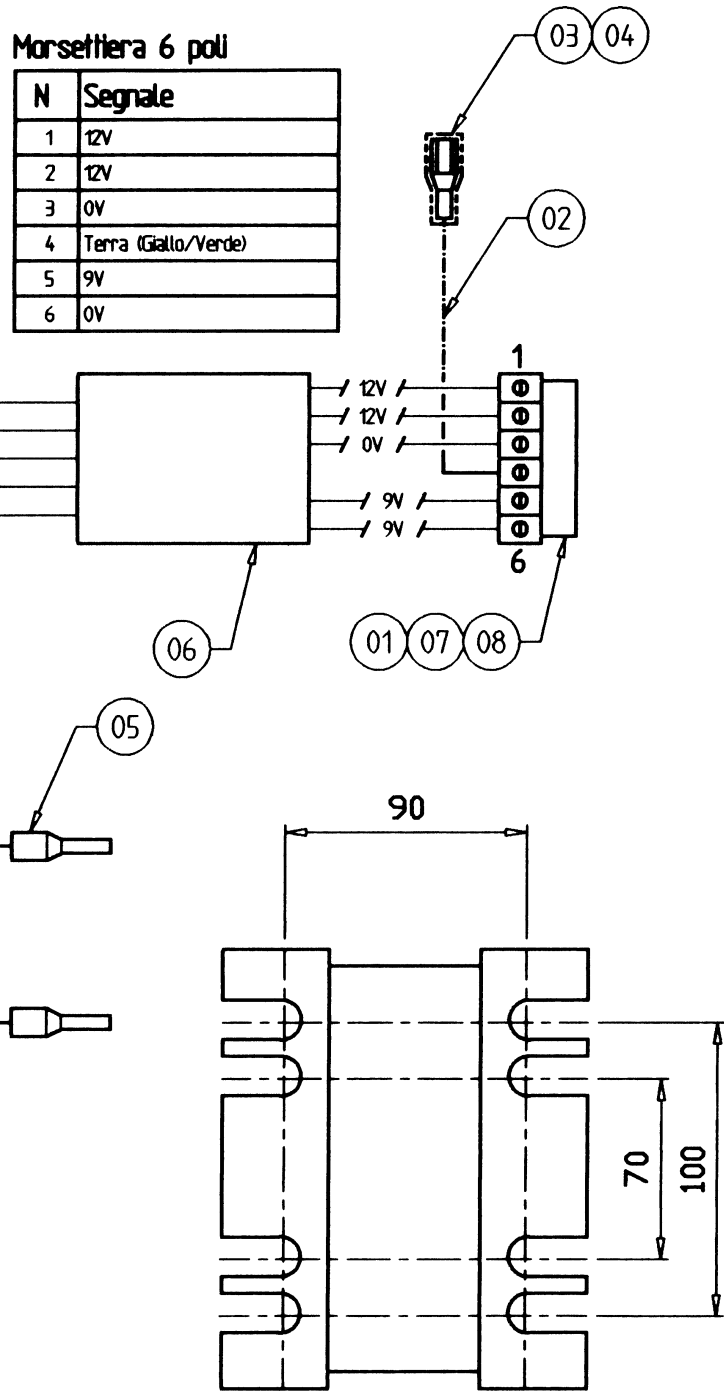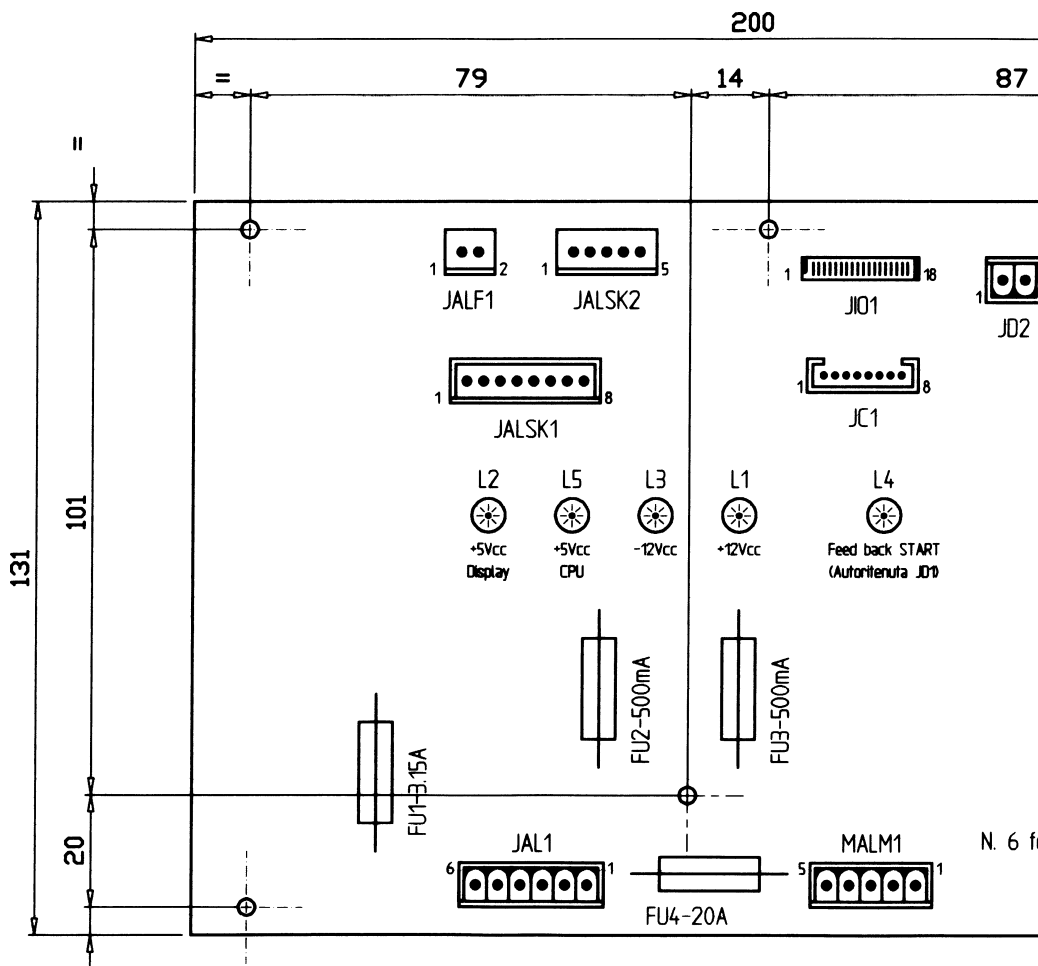
Connettore JALSK2
AMP MTA 5 vie dritto
Alimentazione CPU

1- -12Vcc
2- GND
3- +12Vcc
4- GND
5- +5Vcc

Connettore JALSK1
AMP MODU 8 vie dritto
Alimentazione CPU - Display

1- N.C.
2- -12Vcc
3- GND
4- +12Vcc
5- GND (Display)
6- +5Vcc (Display)
7- GND (CPU)
8- +5Vcc (CPU)

Connettore JD2
WEIDMULLER 2 vie dritto
Input aux

1- Out aux
2- GND
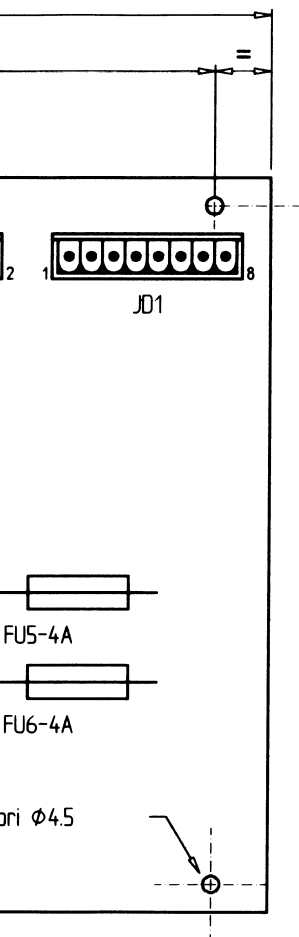
Connettore JALF1
AMP MTA 2 vie dritto
Alimentazione display

1- GND
2- +5Vcc

EM 8040

Connettore JC1
AMP MODUII 1x8 vie dritto
Comandi motore - freno

1- Comando motore
2- GND
3- Comando freno
4- GND
5- Feed back START (autoritenuta)
6- GND
7- Microswitch
8- Out aux

Connettore JD1
MOLEX Picoflex 18 vie dritto
Comandi motore - freno

1- Comando motore
2- NC
3- GND
4- NC
5- Comando freno
6- NC
7- GND
8- NC
9- Feed back START (Autoritenuta)
10- NC
11- GND
12- Out Aux
13- Microswitch
14- Input 5Vcc
15- NC
16- Input 5Vcc
17- GND
18- GND

Connettore JAL1
WEIDMULLER 6 poli dritto
Alimentazione scheda

1- 12Vac
2- 12Vac
3- 0Vac (Centrale)
4- Terra
5- 9Vac
6- 9Vac

Connettore MALM1
WEIDMULLER 5 poli dritto
Alimentaz. motore - freno

1- GND
2- +24Vcc
3- 20Vac
4- 20Vac
5- Terra

Connettore JD1
WEIDMULLER 8 vie dritto
Comando dispositivi

1- Microswitch protezione
2- Microswitch protezione
3- Bobina freno
4- Bobina freno
5- + Bobina Motore
6- GND Bobina Motore
7- Comando AUX
8- Comando AUX

JD1

FU5-4A

FU6-4A

ri Ø4.5

Cod. 454218A

EM 8040

Alimentazioni

JAL1
- 8 — +5V CPU
- 7 — GND CPU
- 6 — +5V DIS
- 5 — GND DIS
- 4 — +12V RAD
- 3 — GND AN.
- 2 — -12V RAD
- 1

AMP MODU I
8X1 90G
P.3.96

Segnali Pick-Up

JPK1
- AGND — 6
- PKI — 5
- AGND — 4
- AGND — 3
- PKE — 2
- AGND — 1

AMP MODU II
6X1 90G
P.2.54

Segnali forcella

JF1
- F1 — 8 — 7 — F2
- VCC — 6 — 5 — F0
- GND — 4 — 3 — F0
- VCC — 2 — 1 — GND

AMP MODU II
4X2 90G
P.2.54

Segnali forcella

JF2
- 8 — F1
- 7 — F2
- 6 — VCC
- 5 — GND
- 4 — /F0
- 3 — VCC
- 2 — GND
- 1

PICOFLEX
8P 90G
P.1.27

Segnali tastatori

JSA2
- 1 — +8VREF
- 2 — IN P1
- 3 — AGND
- 4 — +8VREF
- 5 — IN P2
- 6 — AGND

PICOFLEX
6P 90G
P.1.27

Segnali tastatori

JSA1
- 1 — GND
- 2 — IN P1
- 3 — -8VREF/2
- 4 — +8VREF/2
- 5 — GND
- 6 — IN P2
- 7 — -8VREF/2
- 8 — +8VREF/2
- 9 — GND
- 10 — IN P3
- 11 — -8VREF/2
- 12 — +8VREF/2

AMP MODU II
12X1 90G
P.2.54

Segnali tastatori

JSA3
- 1 — +8VREF
- 2 — IN P3
- 3 — AGND
- 4 — +8VREF
- 5 — IN P4
- 6 — AGND

PICOFLEX
6P 90G
P.1.27

Segnali disp. esterni

JIO1
- /MOTORE — 1
- GND — 2
- GND — 3
- /OUTP1 — 4
- /FRENO — 5
- /OUTP3 — 6
- GND — 7
- /OUTP2 — 8
- /FB.START — 9
- GND — 10
- /INP1 — 11
- /MC.SWITCH — 12
- VCC — 13
- /CART-UP — 14
- VCC — 15
- GND — 16
- GND — 17
- GND — 18

PICOFLEX
18P 90G
P.1.27

Segnali disp. esterni

JC1
- /MOT — 1
- /AUX — 2
- /FRENO — 3
- /INP1 — 4
- /FBS — 5
- GND — 6
- /MCS — 7
- GND — 8

AMP MODU II
8X1 90G
P 2.54

8
47.5
11.5
127
23
21.5

HL1
1AS
3AS
HR3
DY1 DY2 DY3
JALF1
J33
JPS2
LD1
JP12
JI5
J32
T1
LD2
LD3
JPS1
LD4
JK1
LD5
HR5
JMC1
LD6
T3
LD7
JP9
JP10
TP6
JP2
JP11
JT1
JC1
JIO1

EM 8040

229

181.5

8

NHL2

11.5

I   N

SV3

LF2

HM2

LP4
LP3

LP8
LP7

LP9

LP10

DY4   DY5   DY6

LP2
LP1

LP6
LP5

BZ1

LD9

EPR1

150

183

LDA1

LDB1

J13   3

LD8

LDM1

LDB1

3
2
1

JG4

JG10

J6

XT301

LDC1

LDM1

LD12

LD11

LD13

3
2
1

J3

3
2
1

J2

T5   HM11

T6

HM1

21.5

J27   T4

L3   JAL1

T7

JF1

J16

JPK1

JF2

JSA4

JSA1

1

JSA2   JSA3

HHL3

Cod. 452150

EM 8040

CORGHI